COMPLETE

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN No 623906

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	3a. USQ Required?	4. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	B. Gneiting, SE Risk Management and Modelling, H6-33, 372-1663	[] Yes [X] No	05/01/96
	5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Approval Designator
	WHC-SD-WM-TP-431, Rev. 1	N/A	N/A
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.)	9. Related ECN No(s).	10. Related PO No.
	WHC-SD-WM-TP-431, Rev. 0		

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

This document contains the actual test information for the conversion of RDD-100 Version 3.0.2 to Version 4.0.3.

13a. Justification (mark one)

Criteria Change	[]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[X]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

13b. Justification Details

Document has newly inserted test results.

14. Distribution (include name, MSIN, and no. of copies)

N. G. Awadalla	H6-33	C. N. Krohn	H6-33
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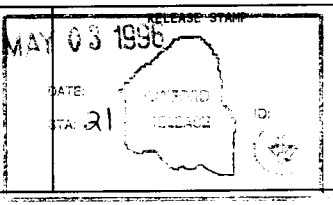

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ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 623906

15. Design Verification Required	16. Cost Impact		17. Schedule Impact (days)
	ENGINEERING	CONSTRUCTION	
[] Yes	Additional [] $	Additional [] $	Improvement []
[] No	Savings [] $	Savings [] $	Delay []

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

20. Approvals

Signature		Date	Signature	Date
OPERATIONS AND ENGINEERING			ARCHITECT-ENGINEER	
Cog. Eng. B. C. Gneiting	B. C. Gneiting	5/2/96	PE	
Cog. Mgr. N. G. Awadalla	N. G. Awadalla	5/2/96	QA	
QA			Safety	
Safety			Design	
Environ.			Environ.	
Other			Other	
			DEPARTMENT OF ENERGY	
			Signature or a Control Number that tracks the Approval Signature	
			ADDITIONAL	

Test Documentation for Converting TWRS Baseline Data from RDD-100 V3.0.2.2 to V4.0.3

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U.S. Department of Energy Contract DE-AC06-87RL10930

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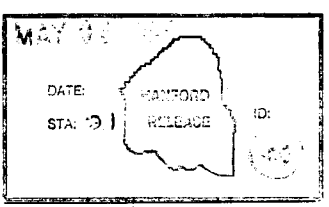
Key Words: RDD-100, Test Plan, requirements management, database.

Abstract: This document describes the test documentation required for converting between two versions of the RDD-100 software application, specifically version 3.0.2.2 and version 4.0.3. The area of focus in the successful conversion of the master data set between two versions of the database tool and their corresponding data structures.



Release Approval Date

Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number WHC-SD-WM-TP-431 Rev. 1	Page 1

(2) Title

Test Documentation for Converting TWRS Baseline Data From RDD-100 V3.02.2 to V4.0.3

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	(6) Cog. Mgr. Date
1 RS	(7) Replace WHC-SD-WM-TP-431 Rev. 0 with WHC-SD-WM-TP-431 Rev. 1 ECN-623906	B.C. Amating 5/2/96	N.G. Awadalla 5/2/96

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1.0 INTRODUCTION

1.1 PURPOSE

A formal systems engineering approach has been adopted at Hanford for the development of major systems like the Tank Waste Remediation System (TWRS). This includes performing the activities of mission analysis, functional analysis, requirements analysis, parametric analysis, and alternative analysis. To manage complex sets of requirements, provide document traceability, and support a broad range of related systems engineering activities, a tool known within Westinghouse Hanford Company (WHC) as the Requirements Management and Assured Compliance System (RMACS) is used. The main software tool in the RMACS system is the RDD-100 software tool set developed by Ascent Logic Corporation (ALC). This tool set contains the systems engineering data describing the TWRS technical baseline. This document provides the test documentation required for the conversion between two versions of the RDD-100 software application, from Version 3.0.2.2 to Version 4.0.3. The testing performed specifically addresses the conversion of the data set between the two versions. The purpose of the test documentation is to verify that the data in the database has come through the conversion without becoming corrupted.

1.2 SCOPE

The testing is intended to confirm that the data converted and then stored in Version 4.0.3 of RDD-100 is identical to the data contained in Version 3.0.2.2. The RDD-100 application is a commercial off-the-shelf software package that has been in use at Hanford for about 3 years. The new version (4.0.3) has been extensively tested by the developer, been in use at Hanford for about 4 months, and has been in use by other companies. Only representative testing of the applications input and output capabilities will be performed to make sure it continues to function as expected. Reports previously developed with the older version (3.0.2.2) of the RDD-100 report writer will not be included in the formal conversion testing because they are always changing and are only used to create specific views of the data to be printed in a report format. Also, any RDD-100 generated reports used to define a technical baseline are independently reviewed for correctness. The extension of the schema to conform with the built-in Design Guide A schema will also not be addressed, as none of the data currently in the database will be affected.

1.3 OVERVIEW

The U.S. Department of Energy (DOE) established the TWRS Program to safely manage and dispose of the tank waste stored at the Hanford Site. The scope of the TWRS Program and projects is to receive, safely store, maintain, treat, and dispose of tank waste. Tank waste includes the current contents of 149 Single-Shell Tanks (SSTs), 28 Double-Shell Tanks (DSTs), 47 miscellaneous tanks, new waste that may be added to these facilities, and all encapsulated cesium and strontium stored onsite and returned from offsite users.

The TWRS Program has adopted a systems engineering approach to integrate all activities necessary to build a system that achieves the tank waste remediation mission. The infrastructure framework being developed to enable effective deployment of systems engineering includes a set of computer-based tools to automate the process and manage information. The RMACS is one of the systems of computer-based tools being used to assist the TWRS management and engineers in the

application of the systems engineering process to the TWRS domain. This system assists the systems engineer in evaluating, analyzing, grouping, connecting, categorizing, storing, and communicating information and data that relate to the tank waste system. As mentioned above, the RDD-100 software application is the main component of RMACS.

Currently TWRS is using RDD-100 Version 3.0.2.2, which is out of date and no longer supported by ALC. Therefore, technical support, consulting, and training services will no longer be available from the vendor. To effectively utilize the investment in RDD-100, upgrading to the current version of RDD, Version 4.0.3, is necessary. The original requirements that led to selecting RDD-100 to support the systems engineering activity and store the technical baseline for TWRS have not changed and are still satisfied by Version 4.0.3. In this version, ALC provides the user with three main templates or schema that have built-in tools or utilities. It was decided to take advantage of the built-in support features and use the Design Guide A schema, which appears to be the best fit for TWRS current and future plans. The product of the conversion activity is to successfully take the current TWRS technical baseline data stored in Version 3.0.2.2 and move it over to Version 4.0.3 without losing any data element definitions or relationships between the elements.

1.4 DEFINITIONS

ALC - Ascent Logic Corporation
DOE - U.S. Department of Energy
DST - Double-Shell Tank
HSTB - Hanford Site Technical Baseline
RDD - RDD-100/Requirements Driven Development
SST - Single-Shell Tank
TWRS - Tank Waste Remediation System

2.0 TEST PLAN

2.1 TEST ITEMS

The TWRS systems engineering data contained in the RDD-100 database, in the form of Elements, Relations, and Attributes, will be tested to confirm the completeness and accuracy after the data is transferred to the new software version.

2.2 FEATURES TO BE TESTED/NOT TO BE TESTED

Conversion Data:

After the data stored in the RDD-100 database is transferred from Version 3.0.2.2 to Version 4.0.3, it will be checked manually to ensure that the new version contains the proper numbers of elements of each type, along with their relationships and attributes. The data will also be sampled to compare the two data sets and verify that there are no differences.

RDD-100:

The RDD-100 Version 4.0.3 software application is a commercial product that was released about a year ago and has been used exclusively by other companies. The product has been thoroughly tested and no further testing is required for this task. However, some representative testing of the software's input and output functions will be performed and reviewed as a result of the data conversion testing. The updated version of RDD provides additional capability, typical of an software upgrade release, that can be utilized by the TWRS Program.

2.3 TEST DELIVERABLES

The test documentation will be contained in one document that defines the test plan, design, procedures, and results. The test results will include the following topics:

Test Logs
Test Incident Reports
Test Summary Reports
Test Output data

2.4 ACCEPTANCE CRITERIA

The individual pass/fail criteria described in Section 3.2 must all be satisfied in order for the conversion as a whole to be accepted.

2.5 TESTING TASKS

Side-by-Side Execution:

A set of updates to the RDD-100 data will be prepared for both versions.

Identical changes will be made to the data stored in both versions using the standard input interface.

The results will be compared manually based on the data collected automatically by the RDD-100 generated reports described below.

Data Count:

A profiling report for Version 3.0.2.2 that will produce an output to match the output from the Database Profile report provided by Version 4.0.3 has been written and checked.

Profiles will be produced for the data sets stored in each version.

The profiles will be compared manually to make sure the number counts for each element and associated relationships are the same.

Detailed Sampling:

A database sampling report that will produce detailed output for a selected number (representative sample) of data items has been written for both versions of RDD-100.

The report will be run on both sets of data.

The output will be compared using the UNIX 'diff' utility, which will output a file of the differences between the two data sets.

2.6 ENVIRONMENTAL NEEDS

The new version of the RDD-100 application has already been installed on a UNIX Sun server with the capability of checking out a license. At least one UNIX Sun station that runs the Solaris 1.1 operating system is required to run the RDD-100 application and produce the reports. The UNIX station needs access to the Sun server over the Hanford Local Area Network (HLAN) to check out a license and to share data with other Sun stations on the network. There are no special security requirements.

2.7 RESPONSIBILITIES

Members of the TWRS Technical Integration team and subcontractors are responsible for all areas of the testing.

2.8 STAFFING AND TRAINING NEEDS

One project leader, in charge of the testing acceptance, timing, and task priorities.

One RDD-100 programmer, to generate the database profile report for Version 3.0.2.2 and to be available if changes need to be made to reports so they produce acceptable output.

Two test technicians, to perform the tests and track progress on individual tests.

All of these resources are available within the current RDD-100 user group, which includes an ALC consultant.

2.9 SCHEDULE

The actual testing will take between one and four days, depending on the number and difficulty of the problems found with the converted data. It is expected, from preliminary tests that the difficulties will be few, minor, and easily resolved.

2.10 RISKS AND CONTINGENCIES

It is assumed that all of the data stored in RDD-100 Version 3.0.2.2 will be converted to Version 4.0.3 without major difficulty. If difficulties are encountered, it is possible that the conversion effort will require a revision of the data storage structure, data, or some other modification. If this occurs, the current RDD-100 Version 3.0.2.2 may still be used until the difficulties are resolved.

3.0 TEST DESIGN

3.1 APPROACH

The data stored in RDD-100 will be tested by running a database profile report for the data in both RDD versions. The profile report will contain counts of instances for each element type and their relationships.

For all element types populated:
Number of instances.
Number of times each attribute is populated.

For all relationships populated:
Number of times each relationship is populated.
Number of times each target of the relationship is used.

The data will also be tested by running a database sampler report on both sets of data. The output from the reports should be in the same format and allow for the data to be sampled as often as desired. At this time, the output interval is every element's name, number, and description. The interval can be easily changed if needed. Then the output for the two sets will be compared using the UNIX "diff" utility.

A third test will round out the set by checking the input features, which are expected to function properly because they have been thoroughly tested by the vendor and other users. Changes will be made through the normal input function to identical data sets in both versions. The reports should yield results similar to those obtained for the first and second test case.

3.2 ITEM PASS/FAIL CRITERIA

The data transfer between versions will pass the test if the profile reports' output show that the two versions have identical profiles and the database sample reports have no differences as identified by the UNIX "diff" utility.

3.3 SUSPENSION CRITERIA AND RESUMPTION REQUIREMENTS

If the data stored in Version 4.0.3 of RDD is found to be different from that stored in the current version, the data testing will stop and will not resume until the reason for the difference is found. If necessary, a work-around path will be defined and testing resumed.

4.0 TEST CASES

The test case format shall consist of a test case identifier, an explanation of the items being tested, input and output specifications, environmental needs, and any special requirements specific to that test case.

4.1 TEST CASE IDENTIFIER

The test cases will be identified by a short description of the testing that is to be performed. Only three test cases are considered necessary at this time: Database Statistics, Database Content, and Database Activity.

4.2 TEST ITEMS

Database Statistics:

This test case will compare the number of instances of each data type for the same data set stored in each of the two versions of RDD-100. The count comparisons will be for: the number of instances of each element type, the number of targets for each relationship available to each element type, and the number of each attribute available for each element type.

Database Content:

This test case will compare selected instances of the elements to make sure they are in the same order in each version of RDD-100 and that the names, numbers, and descriptions of the instances are identical.

Database Activity:

This test case will utilize the normal input features of RDD-100 to make changes to the data set in each version. Next a check will be made to make sure the data was changed and stored correctly in Version 4.0.3 by comparing the database profile reports for the two versions. The changes made to the database supporting the most recent change request package will be made in the new version and a database profile report will be run the make the comparison. This test is performed to round out the test set and check that the input function performs as expected. Because the software has been thoroughly tested by ALC and other users throughout the country, the results of the test are expected to be positive.

4.3 INPUT SPECIFICATIONS

For the first two test cases, the entire RDD-100 data set will be checked without using the standard input features. A data set stored in Version 3.0.2.2 will be converted and stored in Version 4.0.3. The resulting data set will be checked to make sure the conversion was a success. For the Database Activity test case, the normal input functions will be used to make the changes requested in the most recent change request package.

4.4 OUTPUT SPECIFICATIONS

Database Statistics:

The output will be in the form of a table that provides a profile of the data set and sums the number of instances. The format is shown in the Appendix B, **DATABASE PROFILE**. The tables output by the two versions of RDD-100 will be compared to determine whether or not the statistics match.

Database Content:

The output will be in the form of an ASCII text file that consists of groupings of Name, Number, and Description for every instance of every element type in the data set. The files output by the two versions of RDD-100 will be compared by the UNIX "diff" utility to determine whether or not there are any differences.

Database Activity:

The output will be two **Database Profile** reports, which contain the changes to the data set that were requested by the most recent change request package. Data structure profiles will be created for both versions of RDD-100. These two reports will be compared to see if the results are the same. Also the reports created before entering the changes will be compared to make sure both sets of results are consistent.

4.5 SPECIAL REQUIREMENTS

Database Statistics:

No special requirements.

Database Content:

In RDD-100 Version 3.0.2.2, the names of all the instances for all the element types must be changed to all upper case letters. This is required to take into account a difference in the way alphabetizing is done in the two different versions of RDD-100. Because of this, the "diff" utility must be executed using the -I option.

Database Activity:

No special requirements.

4.6 INTERCASE DEPENDENCIES

There are no true dependencies between the first two cases. It is recommended, however, that the Database Statistics test case be performed first, because if it fails, the Database Content test case is guaranteed to fail. There are no dependencies between the second and third cases. The first case must be passed before the third case will have any meaning.

5.0 TEST PROCEDURES

Database Statistics:

1. Log: See Section 7.1, Test Log.
2. Setup: RDD-100 must be started in each version using the appropriate data set.
3. Start: N/A
4. Proceed: Print the **Database Profile**, (Appendix B) report in both versions of RDD-100 and compare the numbers to ensure that they match between the two data sets.
5. Measure: N/A
6. Shutdown: If it becomes necessary to suspend testing, there are no actions that are required to safely shut down.
7. Restart: Simply follow the Setup and Proceed procedures.
8. Stop: N/A
9. Contingencies: Any anomalous events will have to be evaluated before a response can be formulated. Anomalous events will be recorded on the test log and test incident reports (Section 7.2) will be generated to detail the event and its resolution.

Database Content:

1. Log: See attached Test Log.
2. Setup: RDD-100 must be started in each version using the appropriate data set.
3. Start: N/A
4. Proceed: Print the **Database Sampler** report in both versions of RDD-100 and compare the output using the UNIX "diff" utility.
5. Measure: N/A
6. Shutdown: If it becomes necessary to suspend testing, there are no actions that are required to safely shut down.
7. Restart: Simply follow the Setup and Proceed procedures.
8. Stop: N/A
9. Contingencies: Any anomalous events will have to be evaluated before a response can be formulated. Anomalous events will be recorded on the test log and test incident reports will be generated to detail the event and its resolution.

Database Activity:

1. Log: See attached Test Log.
2. Setup: RDD-100 must be started in each version using the appropriate data set.
3. Start: N/A
4. Proceed: Make changes to the data set stored in both versions of RDD-100 using the requested changes in the most recent change request package. Print the **Database Profile** report in both versions of RDD-100 and compare the numbers. The comparison results should be consistent with those obtained in the Database Statistics test case.
5. Measure: N/A
6. Shutdown: If it becomes necessary to suspend testing, there are no actions that are required to safely shut down.
7. Restart: Simply follow the Setup and Proceed procedures.
8. Stop: N/A

9. Contingencies: Any anomalous events will have to be evaluated before a response can be formulated. Anomalous events will be recorded on the test log and test incident reports will be generated to detail the event and its resolution.

6.0 TEST ITEM TRANSMITTAL LIST

6.1 TRANSMITTED ITEMS

The TWRS technical baseline data used to produce the TWRS Functions and Requirements Document, WHC-SD-WM-FRD-020, Rev. 0, is stored in Version 3.0.2.2 of the RDD-100 system engineering software system. The master data set of the TWRS technical baseline, Revision 0, is stored on a Sun SPARC Server named twrsse. The computer files containing this version of the technical baseline are detailed in the Supporting Document "Tank Waste Remediation Systems Technical Baseline Database," document number WHC-SD-WM-CSWD-079, Rev. 0. The master data set was converted to the new version of RDD-100 (4.0.3) and tested.

Several pending changes to the Rev. 0 technical baseline have been made using the 3.0.2.2 version of RDD-100. These change files (RDD-100 delta files) were used in the "database activity" testing. The delta files were obtained from the TWRS RDD-100 System Administrator and converted to the Version 4.0.3 format.

The list of files used in the testing, their full path, and the computer system they reside on are contained in the next section.

6.2 LOCATION

All items used in testing the new version of RDD-100 are files stored on Sun workstations. The Sun workstations containing the original files and the files used in test work area are designated by name as follows:

Sun SPARC Server 1000 - twrsse
Sun SPARC 10/41 - electro (Tester)

The master image file containing the technical baseline (Version 3.0.2.2):
twrsse:/export/rdd/cmb1/twrs/New/twrs/Rev0-030196.im.Z

The original RDD-100 Version 3.0.2.2 change files:

directory:	electro:/home/MEJ881/Conversion/DCRs		
files:	TWR215216.rdt	TWR96246.rdt	TWR96245.rdt
	TWR96217.rdt	TWR96233.rdt.302	TWR96247.rdt
	TWR96230.rdt	TWR96236.rdt	TWR96248.rdt
	TWR96231.rdt.302	TWR96242.rdt	W314002.rdt
	TWR96232.rdt	TWR96244.rdt	W314003.rdt
			W314004.rdt

The Revision 0 technical baseline converted to Version 4.0.3:
electro:/home/MEJ881/Conversion/Rev0-030196.403.im.Z

The change files converted to Version 4.0.3:

directory: twrsse:/export/rdd/302to403/converted
files: same as above except the .302 is removed

6.3 STATUS

All of the items transmitted are configured as expected and do not result in any deviations to the test plan.

7.0 TEST RESULTS

The test results are separated into four main pieces.

1) A summary of the testing performed to verify that the upgrade to a new version of RDD-100 was successful is contained in Appendix A.

2) The database profile tables showing element and relationship counts for four separate images are contained in Appendix B.

3) The report showing database content differences is contained in Appendix C.

4) The test log and incident reports are contained in the sections below.

7.1 CONVERSION TEST LOG

This section summarizes any test anomalies that are written up in a test incident report. The summary is contained in a test log (Table 1). A test witness was not considered necessary for this testing activity and, therefore, was left out of the test log.

Table 1. Conversion to RDD-100 Version 4.0.3 Test Log

Test Case	Pass/Fail	Incident Number or Comment	Signature/Date:
1 Database Statistics	Pass	1-Critical Issues attribute Issue Type See Appendix B, Database Profile image Rev0-030196 (p. B-2) Database Profile image Rev0-040196-403 (p. B-9)	Test Performer: Mark Johnston
2 Database Content	Pass	2-Degree symbol in text See Appendix C	Test Performer: Mark Johnston
3 Database Activity	Pass	See Appendix B, Database Profile image TWRS-0308.v302 (p. B-16) Database Profile image TWRS -030896-403 (p. B-23)	Test Performer: Mark Johnston

7.2 TEST INCIDENT REPORTS

This section contains the Test Incident Reports that are listed in the Test Log. Figure 1 shows the test incident report generated for test Case 1 - Database Statistics and Figure 2 shows the test incident report generated for test Case 2 - Database Content.

Figure 1. Test Incident Report for Test Case 1.

TEST INCIDENT REPORT

Incident No. _1_____ Case No. _1_____ Date _3/28/96_____

Originator _Mark Johnston_____/ __TRW_____ _4/2/96_____
Name Organization Date

Description of Incident:

The Database Profile report shows that in v4.0.3, there are 23 more instances of the element type Critical Issue that have the value 'Issue' for the attribute Issue Type than there are in v3.0.2. This is because in v4.0.3, 'nil' (which was the value for those 23 in v3.0.2) is not a valid value for the Issue Type attribute.

[ ] Fix Before Implementation
[ ] Change in Scope
[ ] Fix After Implementation
[x] No Fix Required

Action Taken:

It was felt that no action was necessary since 'Issue' was the value which probably should have been assigned to the attribute for those elements.

Impact On Previous or Following Tests:

None

Prepared by:

Test Performer _Mark Johnston_____/ __TRW_____ _04/02/96_____
Name Organization Date

Figure 2. Test Incident Report for Test Case 2.

TEST INCIDENT REPORT

Incident No. _2_____ Case No. _2_____ Date _3/28/96_____

Originator _Mark Johnston_____/ __TRW_____ _4/2/96_____
Name Organization Date

Description of Incident:

The UNIX diff utility showed that in three cases the description field of an element contained a degree symbol in version 3.0.2, which is not available in v4.0.3 and showed up as a control character.

[x] Fix Before Implementation
[ ] Change in Scope
[ ] Fix After Implementation
[ ] No Fix Required

Action Taken:

The control character was replaced with the word 'degrees' in all three cases.

Impact On Previous or Following Tests:

None

Prepared by:

Test Performer __Mark Johnston_____/ __TRW_____ _04/02/96_____
Name Organization Date

8.0 REFERENCES

The following documents were used as sources of information for the test plan.

ANSI/IEEE 829-1983, *Standard for Software Test Documentation*, IEEE, 1983.

ANSI/IEEE 1008-1987, *Standard for Software Unit Testing*, IEEE, 1987.

Walker, Kevin G, *Test Plan for the Integrated Dynamic Modeling and Management System (IDDMS)*, LATA, April 26, 1995.

WHC-CM-3-10, *Software Practices*, WHC, January 31, 1993

APPENDIX A

CONVERSION TEST SUMMARY

1.0 Summary

The testing confirmed that conversion of the TWRS technical baseline data from Version 3.0.2.2 to Version 4.0.3 of RDD-100 was successful. None of the three test cases showed any major inconsistencies between the data in RDD-100 v3.0.2 and v4.0.3. The data was tested to be certain that the number of elements, relations and attributes of each type matched, that the name, number and description matched between the two versions, and to provide user confidence in the compatibility between the two versions. The testing was performed by Mark Johnston on a SUN[1]SPARC 10 computer over the course of several days. The data files can be found, along with the reports and output from the reports in the /export/rdd/302to403/Converted directory.

2.0 Variances

None

3.0 Comprehensive Assessment

The testing process was reasonably comprehensive, as it checks almost every aspect of the data transferred. Two aspects were not directly tested. First, some of the attributes were not tested to determine if they contain the correct data; however, the number of times the attributes were populated was checked. Secondly, only spot checks were made to determine if relationships were still associated with the correct elements. The extra effort of manually performing this check on all relationships was not considered necessary, since the count for each set of relationships and elements was correct and the conversion routines in RDD-100 v4.0.3 have had ample time to be thoroughly tested by the vendor and users.

4.0 Summary of Results

In the first test case, there were 23 Critical Issues whose Issue Type attribute was changed to 'Issue' from a value of nil. This is not a problem since all Critical Issues should have their Issue Type attribute populated, and the default value is Issue. In the second test case, there were minor differences between three descriptions of System Requirements in the two versions because of the degree symbol, which is not supported in v4.0.3. The third test case showed no differences.

5.0 Evaluation

Only a few very minor adjustments had to be made to the TWRS baseline data set to complete the conversion to RDD-100 Version 4.0.3. The test results show that the data conversion was a success and the new version of RDD-100 can be used to manage the TWRS technical baseline

[1]SUN is a trademark of SUN Microsystems, Inc.

6.0 Summary of Activities

The major testing activities were writing and debugging the database query reports to be run on the data sets, running those queries, resolving incidents and performing the documentation to support the conversion. The writing and debugging of the database query reports took approximately one week of a single person staffing and computer usage. Running the queries and resolving incidents took three days. Documenting the entire process took approximately one week. The total resource usage for the project was about three weeks of user and machine time, with the total time elapsed from start of the process to the end being four months because of vacations, holidays and other work intervening.

APPENDIX B

DATABASE PROFILES

DATABASE PROFILE

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Rev0-030196

10 April 1996
8:17:49 am

Prepared By:

TWRS Systems Engineering

TABLE 1 DOE Relationships

SystemRequirement	1460	annotated by	Comment 1
		categorized by	Category 1487
		documented by	Source 1020
		incorporated by	SystemRequirement 46
		incorporates	SystemRequirement 46
		primary is	Organization 141
		traced from	CriticalIssue 408
			Decision 281
		traces to	Component 1028
			CriticalIssue 1
			Decision 334
			RequiredAnalysis 1
			Source 5
			TimeFunction 3572
			TimeItem 2355
TimeItem	948	annotated by	Comment 64
		carried by	ItemLink 50
		current decomposition	INet 182
		input to	TimeFunction 917
		output from	TimeFunction 963
		primary is	Organization 150
		refined by	INet 183
		traced from	CriticalIssue 99
			Decision 1
			SystemRequirement 2355

TABLE 1 DOE Relationships

Decision	417	analyzed by	RequiredAnalysis 53
		categorized by	Category 42
		documented by	Source 151
		primary is	Organization 55
		traced from	CriticalIssue 2
			SystemRequirement 334
		traces to	Component 132
			CriticalIssue 91
			SystemRequirement 281
			TimeItem 1
Source	388	annotated by	Comment 213
		categorized by	Category 1
		documents	Decision 151
			RequiredAnalysis 6
			SystemRequirement 1020
		traced from	SystemRequirement 5
CriticalIssue	341	analyzed by	RequiredAnalysis 275
		primary is	Organization 95
		secondary is	Organization 1
		traced from	CriticalIssue 1
			Decision 91
			SystemRequirement 1
		traces to	Component 2
			CriticalIssue 1
			Decision 2

TABLE 1 DOE Relationships

			RequiredAnalysis 3
			SystemRequirement 408
			TimeFunction 7
			TimeItem 99
RequiredAnalysis	333	analyzes	CriticalIssue 275
			Decision 53
		documented by	Source 6
		primary is	Organization 148
		secondary is	Organization 6
		traced from	CriticalIssue 3
			SystemRequirement 1
Comment	304	annotates	ItemLink 80
			Source 213
			SystemRequirement 1
			TimeItem 64
		categorized by	Category 4
TimeFunction	190	current decomposition	FNet 47
		decomposed by	FNet 48
		inputs	TimeItem 917
		outputs	TimeItem 963
		performed by	Component 77
			System 1
		primary is	Organization 11
		traced from	CriticalIssue 7
			SystemRequirement 3572

TABLE 1 DOE Relationships

Component	80	built from	Component 79
		built in	Component 79
		performs	TimeFunction 77
		traced from	CriticalIssue 2
			Decision 132
			SystemRequirement 1028
ItemLink	36	annotated by	Comment 80
		carries	TimeItem 50
Organization	28	primary for	CriticalIssue 95
			Decision 55
			RequiredAnalysis 148
			SystemRequirement 141
			TimeFunction 11
			TimeItem 150
		secondary for	CriticalIssue 1
			RequiredAnalysis 6
Category	8	categorizes	Comment 4
			Decision 42
			Source 1
			SystemRequirement 1487

TABLE 2 DOE Attributes

SystemRequirement	1460	Description	1379
		Line Number	1
		Number	1149
		Paragraph Title	64
TimeItem	948	Size	948
		Description	923
		IDEF0 Type	input: 948
		Number	61
		Message Priority	948
Decision	417	Alternatives	74
		Choice	113
		Description	122
		Number	165
		Problem	4
		Status	Enabling Assumption: 51
			Resolved: 113
Source	388	Abbreviation	1
		Description	286
		Number	50
		Source Type	Meeting Minutes: 1
			Originating Requirements: 215
			Project Memo: 5
			Standard: 2
			Trade-off Study Report: 5
CriticalIssue	341	Actual Date	35
		Description	338
		Issue Type	Issue: 300

TABLE 2 DOE Attributes

			Required Analysis: 18
		Number	137
		Due Date	114
RequiredAnalysis	333	Description	326
		Number	138
Comment	304	Abbreviation	83
		Description	304
TimeFunction	190	Debugging Mode	none: 190
		Description	184
		Execution Level	follow decomposition: 190
		Number	188
Component	80	Description	79
		Number	80
ItemLink	36	Abbreviation	26
		Number	36
Organization	28		
Category	8	Description	1
		Number	3

DATABASE PROFILE

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Prepared By:

TWRS System Engineering

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
SystemRequirement	1460	annotated by	Comment 1
		categorized by	Category 1487
		documented by	Source 1020
		incorporated by	SystemRequirement 46
		incorporates	SystemRequirement 46
		primary is	Organization 141
		traced from	CriticalIssue 408
			Decision 281
		traces to	Component 1028
			CriticalIssue 1
			Decision 334
			RequiredAnalysis 1
			Source 5
			TimeFunction 3572
			TimeItem 2355
TimeItem	948	annotated by	Comment 64
		carried by	ItemLink 50
		current decomposition	INet 182
		input to	TimeFunction 917
		output from	TimeFunction 963
		primary is	Organization 150
		refined by	INet 183
		traced from	CriticalIssue 99
			Decision 1
			SystemRequirement 2355

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
Decision	417	analyzed by	RequiredAnalysis 53
		categorized by	Category 42
		documented by	Source 151
		primary is	Organization 55
		traced from	CriticalIssue 2
			SystemRequirement 334
		traces to	Component 132
			CriticalIssue 91
			SystemRequirement 281
			TimeItem 1
Source	388	annotated by	Comment 213
		categorized by	Category 1
		documents	Decision 151
			RequiredAnalysis 6
			SystemRequirement 1020
		traced from	SystemRequirement 5
CriticalIssue	341	analyzed by	RequiredAnalysis 275
		primary is	Organization 95
		secondary is	Organization 1
		traced from	CriticalIssue 1
			Decision 91
			SystemRequirement 1
		traces to	Component 2
			CriticalIssue 1
			Decision 2
			RequiredAnalysis 3

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			SystemRequirement 408
			TimeFunction 7
			TimeItem 99
RequiredAnalysis	333	analyzes	CriticalIssue 275
			Decision 53
		documented by	Source 6
		primary is	Organization 148
		secondary is	Organization 6
		traced from	CriticalIssue 3
			SystemRequirement 1
Comment	304	annotates	ItemLink 80
			Source 213
			SystemRequirement 1
			TimeItem 64
		categorized by	Category 4
TimeFunction	190	current decomposition	FNet 47
		decomposed by	FNet 48
		inputs	TimeItem 917
		outputs	TimeItem 963
		performed by	Component 77
			System 1
		primary is	Organization 11
		traced from	CriticalIssue 7
			SystemRequirement 3572
Component	80	built from	Component 79
		built in	Component 79

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
		performs	TimeFunction 77
		traced from	CriticalIssue 2
			Decision 132
			SystemRequirement 1028
ItemLink	36	annotated by	Comment 80
		carries	TimeItem 50
Organization	28	primary for	CriticalIssue 95
			Decision 55
			RequiredAnalysis 148
			SystemRequirement 141
			TimeFunction 11
			TimeItem 150
		secondary for	CriticalIssue 1
			RequiredAnalysis 6
Category	8	categorizes	Comment 4
			Decision 42
			Source 1
			SystemRequirement 1487

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
SystemRequirement	1460	Description	1379
		Line Number	1
		Number	1149
		Paragraph Title	64
TimeItem	948	Size	948
		Description	923
		IDEF0 Type	input: 948
		Number	61
		Message Priority	948
Decision	417	Alternatives	74
		Choice	113
		Description	122
		Number	165
		Problem	4
		Status	Enabling Assumption: 51
			Resolved: 113
Source	388	Abbreviation	1
		Description	286
		Number	50
		Source Type	Meeting Minutes: 1
			Originating Requirements: 215
			Project Memo: 5
			Standard: 2
			Trade-off Study Report: 5
CriticalIssue	341	Actual Date	35
		Description	338
		Issue Type	Issue: 323
			Required Analysis: 18
		Number	137

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
		Due Date	114
RequiredAnalysis	333	Description	326
		Number	138
Comment	304	Abbreviation	83
		Description	304
TimeFunction	190	Debugging Mode	none: 190
		Description	184
		Execution Level	follow decomposition: 190
		Number	188
Component	80	Description	79
		Number	80
ItemLink	36	Abbreviation	26
		Is Constrained	false: 36
		Number	36
Organization	28		
Category	8	Description	1
		Number	3

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

DATABASE PROFILE

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10 April 1996
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Prepared By:

TWRS Systems Engineering

TABLE 1 DOE Relationships

SystemRequirement	1618	annotated by	Comment 1
		categorized by	Category 1609
		documented by	Source 1035
		incorporated by	SystemRequirement 46
		incorporates	SystemRequirement 46
		primary is	Organization 141
		traced from	CriticalIssue 410
			Decision 280
		traces to	Component 1028
			CriticalIssue 2
			Decision 333
			RequiredAnalysis 1
			Source 5
			TimeFunction 3746
			TimeItem 2364
			VerificationMethod 453
TimeItem	958	annotated by	Comment 64
		carried by	ItemLink 51
		current decomposition	INet 183
		input to	TimeFunction 938
		output from	TimeFunction 978
		primary is	Organization 150
		refined by	INet 184
		traced from	CriticalIssue 101
			Decision 1

TABLE 1 DOE Relationships

			SystemRequirement 2364
Decision	418	analyzed by	RequiredAnalysis 54
		categorized by	Category 42
		documented by	Source 151
		primary is	Organization 55
		traced from	CriticalIssue 2
			SystemRequirement 333
		traces to	Component 134
			CriticalIssue 91
			SystemRequirement 280
			TimeItem 1
Source	393	annotated by	Comment 213
		documents	Decision 151
			RequiredAnalysis 7
			SystemRequirement 1035
		traced from	SystemRequirement 5
CriticalIssue	344	analyzed by	RequiredAnalysis 276
		categorized by	Category 1
		primary is	Organization 95
		secondary is	Organization 1
		traced from	CriticalIssue 1
			Decision 91
			SystemRequirement 2
		traces to	Component 2
			CriticalIssue 1

TABLE 1 DOE Relationships

			Decision 2
			RequiredAnalysis 3
			SystemRequirement 410
			TimeFunction 8
			TimeItem 101
TimeFunction	337	current decomposition	FNet 74
		decomposed by	FNet 75
		inputs	TimeItem 938
		outputs	TimeItem 978
		performed by	Component 81
			System 1
		primary is	Organization 11
		traced from	CriticalIssue 8
			SystemRequirement 3746
RequiredAnalysis	336	analyzes	CriticalIssue 276
			Decision 54
		documented by	Source 7
		primary is	Organization 147
		secondary is	Organization 6
		traced from	CriticalIssue 3
			SystemRequirement 1
Comment	304	annotates	ItemLink 80
			Source 213
			SystemRequirement 1
			TimeItem 64

TABLE 1 DOE Relationships

		categorized by	Category 4
Component	82	built from	Component 80
		built in	Component 80
		performs	TimeFunction 81
		traced from	CriticalIssue 2
			Decision 134
			SystemRequirement 1028
ItemLink	36	annotated by	Comment 80
		carries	TimeItem 51
Organization	28	primary for	CriticalIssue 95
			Decision 55
			RequiredAnalysis 147
			SystemRequirement 141
			TimeFunction 11
			TimeItem 150
		secondary for	CriticalIssue 1
			RequiredAnalysis 6
Category	9	categorizes	Comment 4
			CriticalIssue 1
			Decision 42
			SystemRequirement 1609
VerificationMethod	5	traced from	SystemRequirement 453

TABLE 2 DOE Attributes

SystemRequirement	1618	Description	1539
		Line Number	1
		Number	1308
		Paragraph Title	64
TimeItem	958	Size	958
		Description	934
		IDEF0 Type	input: 958
		Number	61
		Message Priority	958
Decision	418	Alternatives	75
		Choice	115
		Description	122
		Number	167
		Problem	4
		Status	Enabling Assumption: 51
			Resolved: 113
Source	393	Abbreviation	1
		Description	288
		Number	51
		Source Type	Meeting Minutes: 1
			Originating Requirements: 215
			Project Memo: 5
			Standard: 2
			Trade-off Study Report: 5
CriticalIssue	344	Actual Date	35
		Description	341
		Issue Type	Issue: 303

TABLE 2 DOE Attributes

			Required Analysis: 18
		Number	137
		Due Date	114
TimeFunction	337	Debugging Mode	none: 337
		Description	327
		Execution Level	follow decomposition: 337
		Number	335
RequiredAnalysis	336	Description	329
		Number	138
Comment	304	Abbreviation	83
		Description	304
Component	82	Description	81
		Number	82
ItemLink	36	Abbreviation	26
		Number	36
Organization	28		
Category	9	Number	3
VerificationMethod	5		

DATABASE PROFILE

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Prepared By:

TWRS Systems Engineering

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
SystemRequirement	1618	annotated by	Comment 1
		categorized by	Category 1609
		documented by	Source 1035
		incorporated by	SystemRequirement 46
		incorporates	SystemRequirement 46
		primary is	Organization 141
		traced from	CriticalIssue 410
			Decision 280
		traces to	Component 1028
			CriticalIssue 2
			Decision 333
			RequiredAnalysis 1
			Source 5
			TimeFunction 3746
			TimeItem 2364
			VerificationMethod 453
TimeItem	958	annotated by	Comment 64
		carried by	ItemLink 51
		current decomposition	INet 183
		input to	TimeFunction 924
		output from	TimeFunction 978
		primary is	Organization 150
		refined by	INet 184
		traced from	CriticalIssue 101
			Decision 1
			SystemRequirement 2364

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
Decision	418	analyzed by	RequiredAnalysis 54
		categorized by	Category 42
		documented by	Source 151
		primary is	Organization 55
		traced from	CriticalIssue 2
			SystemRequirement 333
		traces to	Component 134
			CriticalIssue 91
			SystemRequirement 280
			TimeItem 1
Source	393	annotated by	Comment 213
		documents	Decision 151
			RequiredAnalysis 7
			SystemRequirement 1035
		traced from	SystemRequirement 5
CriticalIssue	344	analyzed by	RequiredAnalysis 276
		categorized by	Category 1
		primary is	Organization 95
		secondary is	Organization 1
		traced from	CriticalIssue 1
			Decision 91
			SystemRequirement 2
		traces to	Component 2
			CriticalIssue 1
			Decision 2
			RequiredAnalysis 3

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
			SystemRequirement 410
			TimeFunction 8
			TimeItem 101
RequiredAnalysis	336	analyzes	CriticalIssue 276
			Decision 54
		documented by	Source 7
		primary is	Organization 147
		secondary is	Organization 6
		traced from	CriticalIssue 3
			SystemRequirement 1
TimeFunction	330	current decomposition	FNet 76
		decomposed by	FNet 77
		inputs	TimeItem 924
		outputs	TimeItem 978
		performed by	Component 81
			System 1
		primary is	Organization 11
		traced from	CriticalIssue 8
			SystemRequirement 3746
Comment	304	annotates	ItemLink 80
			Source 213
			SystemRequirement 1
			TimeItem 64
		categorized by	Category 4
Component	82	built from	Component 80
		built in	Component 80

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 1 DOE Relationships

ELEMENT TYPE*	INSTANCES	RELATIONSHIP NAME	RELATIONSHIPS
		performs	TimeFunction 81
		traced from	CriticalIssue 2
			Decision 134
			SystemRequirement 1028
ItemLink	36	annotated by	Comment 80
		carries	TimeItem 51
Organization	28	primary for	CriticalIssue 95
			Decision 55
			RequiredAnalysis 147
			SystemRequirement 141
			TimeFunction 11
			TimeItem 150
		secondary for	CriticalIssue 1
			RequiredAnalysis 6
Category	9	categorizes	Comment 4
			CriticalIssue 1
			Decision 42
			SystemRequirement 1609
VerificationMethod	5	traced from	SystemRequirement 453

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
SystemRequirement	1618	Description	1539
		Line Number	1
		Number	1308
		Paragraph Title	64
TimeItem	958	Size	958
		Description	934
		IDEF0 Type	input: 958
		Number	61
		Message Priority	958
Decision	418	Alternatives	75
		Choice	115
		Description	122
		Number	167
		Problem	4
		Status	Enabling Assumption: 51
			Resolved: 113
Source	393	Abbreviation	1
		Description	288
		Number	51
		Source Type	Meeting Minutes: 1
			Originating Requirements: 215
			Project Memo: 5
			Standard: 2
			Trade-off Study Report: 5
CriticalIssue	344	Actual Date	35
		Description	341
		Issue Type	Issue: 326
			Required Analysis: 18
		Number	137

* Element Types with no instances are not listed. Element types are sorted by the number of instances.

TABLE 2 DOE Attributes

ELEMENT TYPE*	INSTANCES	ATTRIBUTE NAME	ATTRIBUTES
		Due Date	114
RequiredAnalysis	336	Description	329
		Number	138
TimeFunction	330	Debugging Mode	none: 330
		Description	320
		Execution Level	follow decomposition: 330
		Number	328
Comment	304	Abbreviation	83
		Description	304
Component	82	Description	81
		Number	82
ItemLink	36	Abbreviation	26
		Is Constrained	false: 36
		Number	36
Organization	28		
Category	9	Number	3
VerificationMethod	5		
* Element Types with no instances are not listed. Element types are sorted by the number of instances.			

APPENDIX C

Database Content Differences

The following is the output from the UNIX[2] diff utility run on two files, each of which contains the name, number and description of every element in the respective databases. It shows that the only differences between the two data sets is in the three places that the degree symbol is used. The degree symbol is evidently accessible in RDD-100 v3.0.2 but not in RDD-100 v4.0.3, and so it shows up as an capital e with a caret over it. Since a method of directly printing the degree symbol in Version 4.0.3 has not been found, the substitution of the word degrees in place is the symbol is recommended.

9585c9585
< A. Free gas other than air, cover, and radiogenic gases with an immediate internal gas pressure no to exceed 150kPa (22psia) at 25°C. Cover gases shall be helium, argon, or other inert gases. [Derived]

> A. Free gas other than air, cover, and radiogenic gases with an immediate internal gas pressure no to exceed 150kPa (22psia) at 25°C. Cover gases shall be helium, argon, or other inert gases. [Derived]
11688c11688
< Description: At the time of shipment, the producer shall certify that after the initial cool-down, the waste form temperature has not exceeded 400°C. The producer shall describe the method of compliance in the WCP.

> Description: At the time of shipment, the producer shall certify that after the initial cool-down, the waste form temperature has not exceeded 400°C. The producer shall describe the method of compliance in the WCP.
11741c11741
< Description: The producer shall ensure that the canistered waste form does not contain detectable amounts of explosive, pyrophoric, or combustible materials. The producer shall describe the method of compliance in the WCP and provide documentation of, the detection limits, and the ability to comply with this specification for the range of waste types, in the WQR. The producer shall document in the WQR that the canistered waste forms remain nonexplosive, nonpyrophoric, and noncombustible after having been subjected to temperatures up to 500°C.

> Description: The producer shall ensure that the canistered waste form does not contain detectable amounts of explosive, pyrophoric, or combustible materials. The producer shall describe the method of compliance in the WCP and provide documentation of, the detection limits, and the ability to comply with this specification for the range of waste types, in the WQR. The producer shall document in the WQR that the canistered waste forms remain nonexplosive, nonpyrophoric, and noncombustible after having been subjected to temperatures up to 500°C.

[2]UNIX is a trademark licensed exclusively through X\Open Company, Ltd.